

Fox (L. W.)

Compliments of L. Webster Fox M.D.
1304 Walnut St. Phila., Pa.

*Burns of the Cornea; Electric-Light Explosion
Causing Temporary Blindness; Traumatic
Injuries to Eyes—Hypopyon.*

By L. WEBSTER FOX, M.D.,

Professor of Ophthalmology in the Medico-Chirurgical College, Philadelphia, Penna.

Clinical Lecture delivered at the Medico-Chirurgical College, March 9, 1895.

Reprinted from THE MEDICAL BULLETIN.



BURNS OF THE CORNEA; ELECTRIC-LIGHT EXPLOSION CAUSING TEMPORARY BLINDNESS; TRAUMATIC INJURIES TO EYES—HYPOPYON.*

By L. WEBSTER FOX, M.D.,

Professor of Ophthalmology in the Medico-Chirurgical College, Philadelphia, Penna.

BURNS OF THE CORNEA.

GENTLEMEN :—

THE boy whom I bring before you first this morning met with a most serious accident last evening. While standing on the sidewalk watching a civic parade he accidentally had a Roman candle explode in his face; he received the full discharge, burning his lashes and eyebrows and scorching the skin about his eyes. The left one received the greater part of the flame, and, in consequence, is the more severely injured. The accident happened about 8 o'clock, and he was brought to the hospital a few minutes later. The house-surgeon, Dr. Pfromm, immediately instilled atropia and bathed the eyes with a boric solution. I was called to see the case and made an examination about two hours after the accident. Upon elevating the eyelids I found both eyes more or less sprinkled with grains of powder and fine particles of clay, notwithstanding the treatment. Both eyes were again thoroughly irrigated with filtered water so as to wash away the fine particles of foreign matter remaining in both cornea and conjunctiva. Plenty of water was applied by means of our hydrostatic eye-douche. Atropia was again instilled and both eyes sealed with sterilized vaselin; over this came the eye-pads, all held securely in place by adhesive strips. The patient was not disturbed during the night, and we now, in your presence, make another examination. I find, upon removing the pads, that the eyelids are somewhat swollen, red, and showing distinctly the effects of the burns. Upon elevating the upper lid of the

right eye the conjunctiva is pink, and on the cornea a few imbedded particles of foreign matter still remain; these we shall wash away with water as hot as can be borne by our patient. You will notice how this is done: the reservoir is held to a certain height, to give the water at the nozzle of the pipette greater force. I find that we have succeeded in washing away the particles, and the surface of the cornea appears perfectly clean. The left eye is in a more critical condition, the upper third of the cornea showing the effects of the burn, being quite opalescent and with a decidedly lacerated surface, as if the particles of foreign matter had torn away the epithelium and destroyed part of the cornea propria. I shall irrigate this eye with the warm water even more carefully than was done in the other eye, so as to be sure to wash away all the foreign matter and, possibly, remove the lacerated tissues hanging on by shreds. The atropia is again dropped into the eyes and both eyes again sealed by a thick coating of sterilized vaselin and eye-pads. The eyes will be dressed again in twelve hours and continued until all danger is past. The prognosis in the right eye promises well. In the left we must reserve our opinion for forty-eight hours. Burns from fire, alkalis, or acids are always deceptive, and in no case should you give a positive opinion as to the prognosis until several days after the accident.

I again wish to call your attention to the treatment of gunpowder burns in the face and eyes. One line of treatment is to try to pick off the grains of powder from the cornea or the face with a spud. This is a dangerous procedure and it is simply impossible to get away all the powder, while in your efforts to relieve

* Clinical lecture delivered at the Medico-Chirurgical College, March 9, 1895.



the patient you make matters worse by irritating the already-damaged cornea. What must be done is, first, to wash the face with hot water; use it freely. The water will enter the small openings in the face and dissolve the grains of powder, and the excessive fluid will cleanse the parts thoroughly. After the face is cleansed attend to the eyes. Keep the lids apart with a speculum, and with the eyedouche irrigate the eyeballs. The patient will at first try to evade the full stream by rolling his eyes upward, but in a short time he will roll both eyes downward and you will then see the good results of this procedure. The force of the stream may be thrown against the cornea. This playing the water against the eyeball may be kept up at intervals of every few minutes, until you feel that you have done all at one sitting that is fairly consistent with the comfort of the patient. Atropia is again instilled in both eyes, if affected, and both are sealed with sterilized vaselin and eye-pads. In twelve hours the cleansing process may be repeated.

I have had three cases within the last two years where this line of treatment was followed out, and it has proven itself entirely satisfactory, very little or no injury to the sight and very little or no tattooing of the face resulting. I hope, gentlemen, that you will remember this, as I know of no treatment equal to it in just such serious cases of which this boy is an example.

Gunpowder explosions constitute only one of a series of accidents which may come under your observation and demand your skill,—boiling water, mortar, melted fat, the many acids (particularly sulphuric acid), caustic potash, explosions from kerosene-lamps or from gas, etc. In some of these accidents the cornea may escape and the conjunctiva only receive the injury. I have in mind a case where the conjunctiva was destroyed by quicklime. It first assumed a white, swollen appearance, and in a few days the cornea became infiltrated; and, in spite of the most active treatment, the cornea sloughed and the eye was lost, ten days after the accident.

A woman presented herself at the clinic last summer who accidentally received a drop of whitewash in her eye. The hypersecretion of tears washed away most of the lime, yet sufficient remained behind to provoke a most serious condition. By placing the patient in

bed, keeping on hot pads (which is good treatment after active inflammation has set in), and instillations of eserine, gr. $\frac{1}{4}$ to $\frac{3}{4}$ every two hours, the eye was saved with fairly good vision.

When the cornea is touched by a gas flame, hot iron, curling iron, or melted lead the epithelium of the cornea is whitened, coagulated like a layer of albumin, and raised like a blister; this part of the eye is always sure to desquamate. If the burn have extended into the deeper layers of the cornea we may look for very serious complications, and tedious ulceration even going on to perforation of the cornea. Staphyloma may develop and the vision be lost.

To show you the result of the caustic-potash burn I have asked this little patient to come before the class. She is now 9 years of age. Several years ago she accidentally rubbed a certain quantity of potash (caustic) into both eyes. Her father is a dairyman, and on this occasion had a small open can of this strong alkali standing near some milk-cans which he used in their cleansing. The little girl, then 5 years of age (the accident happened February 23, 1890), got the alkali and somehow rubbed this substance into both eyes, enough to produce a very severe inflammation. As you notice, both eyelids have grown fast to the right eyeball (ankyloblepharon), but the growing fast of the eyelids has caused blindness to this eye. In the left eye the lower lid became attached to the cornea, causing symblepharon and also blindness. Finding a clear part of the cornea toward the upper and inner quadrant, and hoping that possibly by separating the eyelids more corneal space could be obtained, I separated the lower lid and transplanted the conjunctiva of the rabbit. I simply have to show you the eye to prove the success of the operation. The child is now able to attend school and can follow her studies fairly well. At some future time I may attempt to separate both eyelids from the other eyeball and transplant the skin of the frog, which in the hands of certain operators has been successful.

This man, who has been referred to the clinic by Dr. Muhlenberg, of Reading, is almost a parallel case,—an explosion of hot metal burning both eyes and eyelids,—the left eye is completely closed and both lids fastened to the eyeball, causing blindness. The left

lower lid is attached to the cornea of the left eye; upon examination I find that very little cornea is free, enough, however, after separating the eyelid and performing an iridectomy, to give the patient some vision. I take it for granted that the crystalline lens is clear and the fundus normal.*

To recapitulate treatment: In gunpowder explosions irrigate the eyes thoroughly with hot water, instill atropia and cocaine, anoint the eyelids with sterilized vaselin, cover this with eye-pads kept moistened with "Eye Lotion No. 2" of the Pharmacopœia of the Hospital, and so exclude the air. In burns from any flame use atropia up to 40 years of age (for you might provoke glaucoma after this age), eserine after 40. Vaseline-saturated eye-pads kept wet day and night.

For alkali burns apply any oil or melted tallow, or unsalted butter when you cannot obtain vaselin, which is, however, almost always to be found in every household, and may take the place of the oils or tallow, butter or thick cream. Bathe the eyes with our favorite lotion, which is composed of the following ingredients:—

R	Acidi borici,	.	.	.	gr. xx
	Aq. menth. pip.,	.	.	f3ij.	
	Aq. camph.,				
	Aq. destil.,	.	.	aa	f3ij.—M.

Eserine sulph., gr. $\frac{1}{4}$ to 3ij, one drop every three hours.

I am sure that this drug will assist in saving the integrity of the cornea when all hope seems gone. Eserine reduces the tension and is also an antiseptic of considerable value.

Dry acids are more destructive and if any quantity is thrown into the eyes the cornea is destroyed immediately and you can hold out but very little hope to your patient. Diluted acids, while liable to cause trouble, are not so serious, and much may be done by using alkali waters immediately, such as salt water or boric acid solutions.

We may also add local depletions, such as leeching, and in some cases I am old-fashioned enough to try blood-letting at the arm. Under all circumstances the patient must be kept in

bed and in a darkened room, and as a local anodyne we may use externally the extract of belladonna. Each and every case of burns to the eye must be a law unto itself, and I can only in a general way give you rules to follow in the treatment.

TEMPORARY BLINDNESS DUE TO ELECTRIC EXPLOSION.

The case which I show you now is one of particular interest. Three hours ago this man was blinded by a sudden explosion in a trolley-car. He was shunting the current, and, as you are aware, the current of electricity running through a trolley wire is a force of tremendous power, either for generating light or force. This man, as I remarked before, was shunting the current in his car, and he did it with a large, steel screw-driver. As soon as he made the connection there was a tremendous explosion, and the man was blinded by the terrific light produced, causing paralysis of the retina. He was brought to the hospital in this condition. Warm applications were immediately applied, and he was kept in a darkened room. In examining the eye I find nothing, apparently, the matter with the cornea; pupil widely dilated; the blood-vessels of the fundus oculi contracted; and the disc pale. He is now gradually regaining his vision; and while, at the present moment, he could not possibly find his way home, yet in a few hours he will, in all probability, be fully restored to vision. Warm application is the treatment in such cases. Strong currents of electricity contract the blood-vessels, causing a temporary paralysis of the coats of the arteries, suspending circulation, which causes blindness, and, where the granular layers of the retina are not destroyed, we may expect a restoration of vision.

Our experience in such cases, from the recent introduction of the trolley-system, is very limited; but the very few cases on record show that only temporary blindness follows these accidents. If the current were to pass through the body death would surely follow.

A short time ago I had the opportunity of assisting in the electrocution of six dogs by the alternating current carried out by Professors Houston and Kennelly. The experiments were made to refute Dr. d'Arsonval's theory, that, in the electrocutions in New York State, death is not produced by the electric current,

* This patient was cured of symblepharon by separating the lower eyelid from the eyeball and covering the raw surface by transplanting a strip of conjunctiva taken from the upper part of the eyeball, leaving the one end attached to the eyeball to insure the circulation, and holding the other end of the graft by stitches. The iridectomy has not yet been performed.

rather leaving the public to infer that it is produced by the knife of the surgeon in the autopsy which always follows. I made the ophthalmoscopic examination immediately after death, and at intervals of ten seconds until the blood-vessels almost entirely disappeared. The pupils were dilated to full mydriasis; the veins full; arteries attenuated, shrunk to less than normal width; the optic nerves full pink color; in a very few seconds the calibre of veins and arteries shrunk to hair-lines and the optic nerves became very white. All the dogs were again examined in ten or fifteen minutes, and at this time the fundus oculi was very pale and only the faintest traces of veins could be seen. In one dog death was not instantaneous and the circulation returned with the return of consciousness, when the current was turned on again until death; the same contraction of the blood-vessels took place, and in ten minutes faded away.

TRAUMATIC INJURIES TO EYES; HYPOPYON.

The last patient which I present to you belongs to a class that you will frequently have to prescribe for,—hypopyon, pus in the anterior chamber due to a blow upon the cornea from a small stone. Let me impress upon you that a bruise of the cornea is a very serious injury, and do not venture an opinion too hastily. This man had no untoward symptoms from the injury for several days; then, suddenly, he experienced a lancinating pain, flashes of light, phosphenes, intense lachrymation, and photophobia. For twenty-four hours he applied domestic remedies, as tea-leaves, hot water,

etc.; but the pain grew worse, and he came to the clinic yesterday with an eye congested and very painful, anterior chamber half full of pus, pupil contracted,—an evidence of pain,—and the cornea, apparently, infiltrated, with a marked tendency to desquamation of the epithelium.

What is to be done to preserve the eyeball and save vision? No internal nor external application of drugs will save the eyeball. The only operation which holds out hope is the one suggested by Saemisch: pass a small Graefe knife horizontally through the lower third of the cornea; this allows the pus to escape through the opening and also has an antiphlogistic action on the bruised cornea; then, by irrigating the parts well with the lotio boracis and instillation of atropia and bandages, we may look forward toward rapid recovery of the wound. The patient is kept in bed, and internally small doses of calomel prescribed. Were we to allow this breaking down of the cornea to go on, perforation of the cornea would surely follow in twenty-four hours and blindness as the inevitable result. The operation was suggested to the patient yesterday, but he refused, and it was only by suffering twenty-four hours more of torture and agony that, to-day, he is even willing to have the eyeball removed to get relief. You will frequently have many cases with serious afflictions hanging over them, which necessarily require prompt action; and, if the patient or, what is worse, at times, the friends of the patient refuse to heed your advice, you must withdraw and let the patient assume the dire results which will surely follow.

